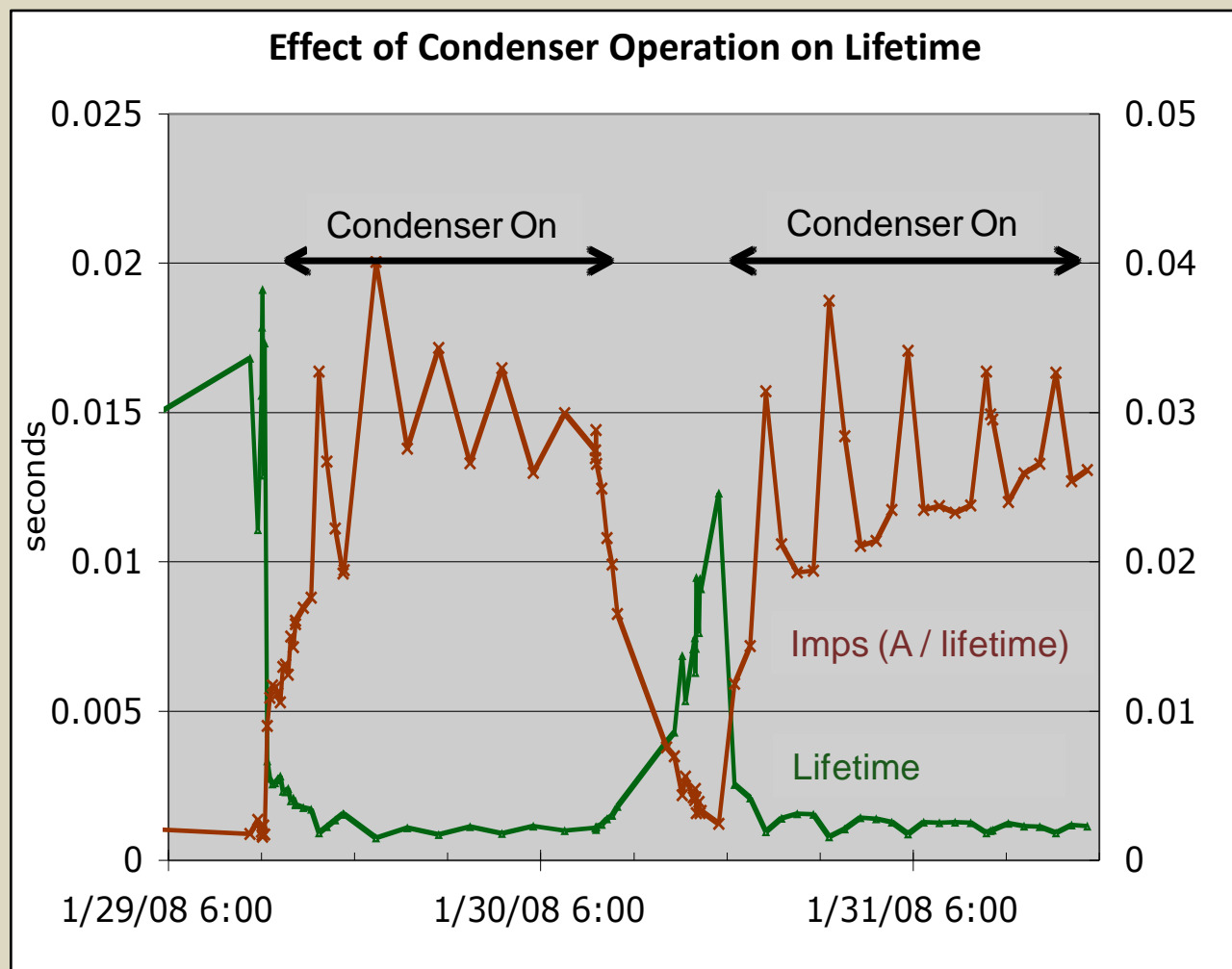
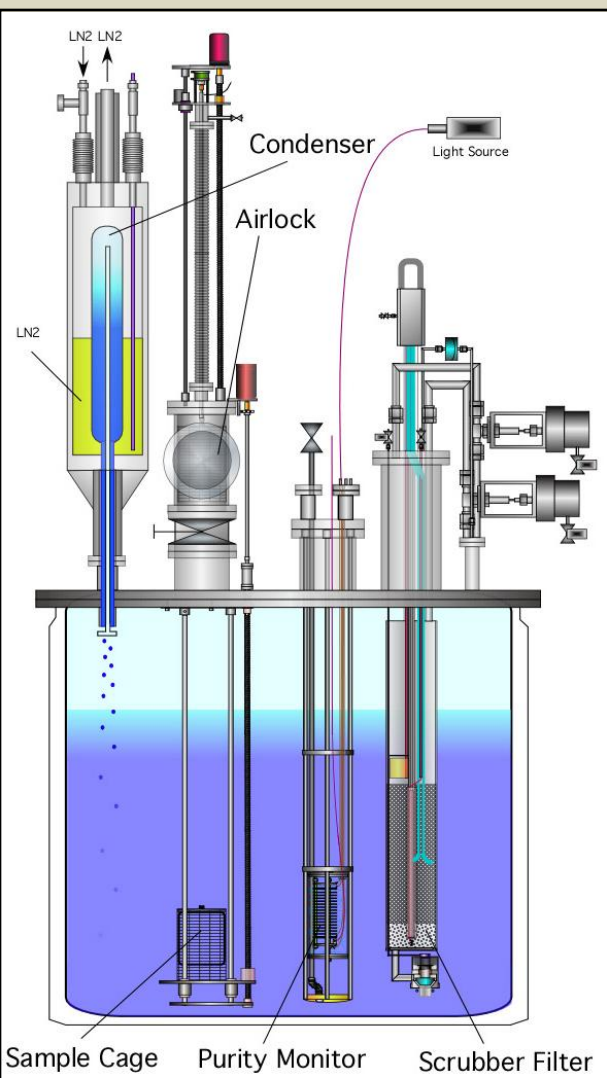


Closed-System Issues

Condenser Effects on Drift Lifetime

Reed Andrews
26 January 2009

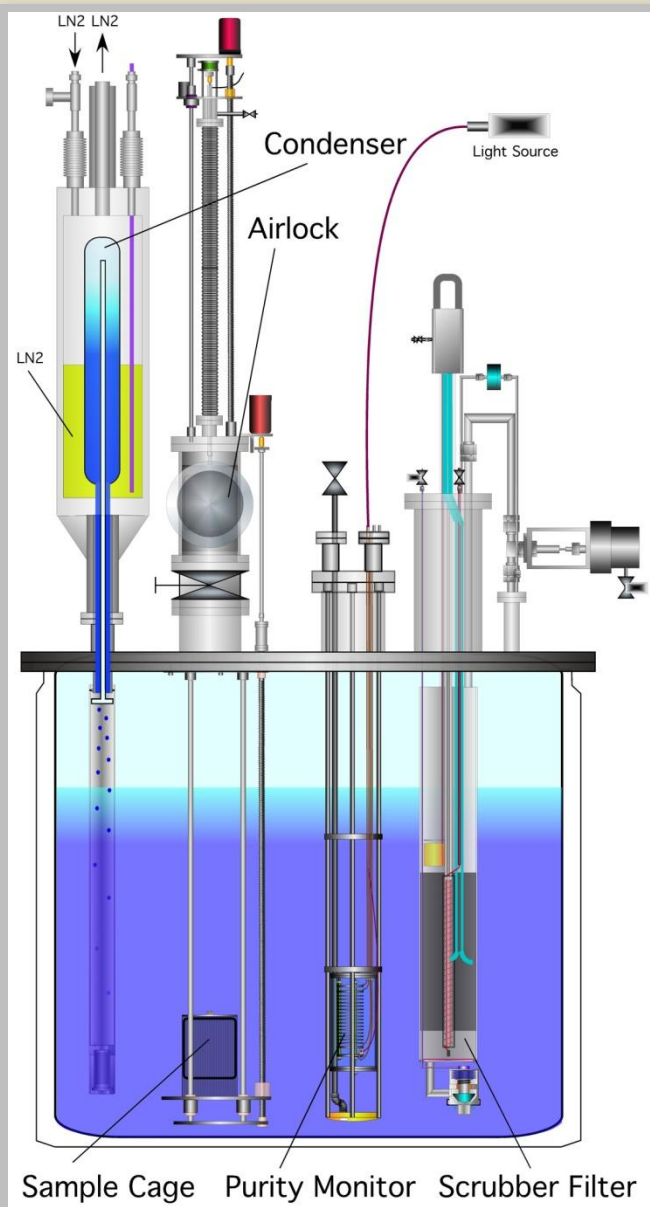


Theories of Condenser-Associated Impurities

- Ions
 - Created by liquid separating from metal
- Particles
 - Ice
- Charged Particles

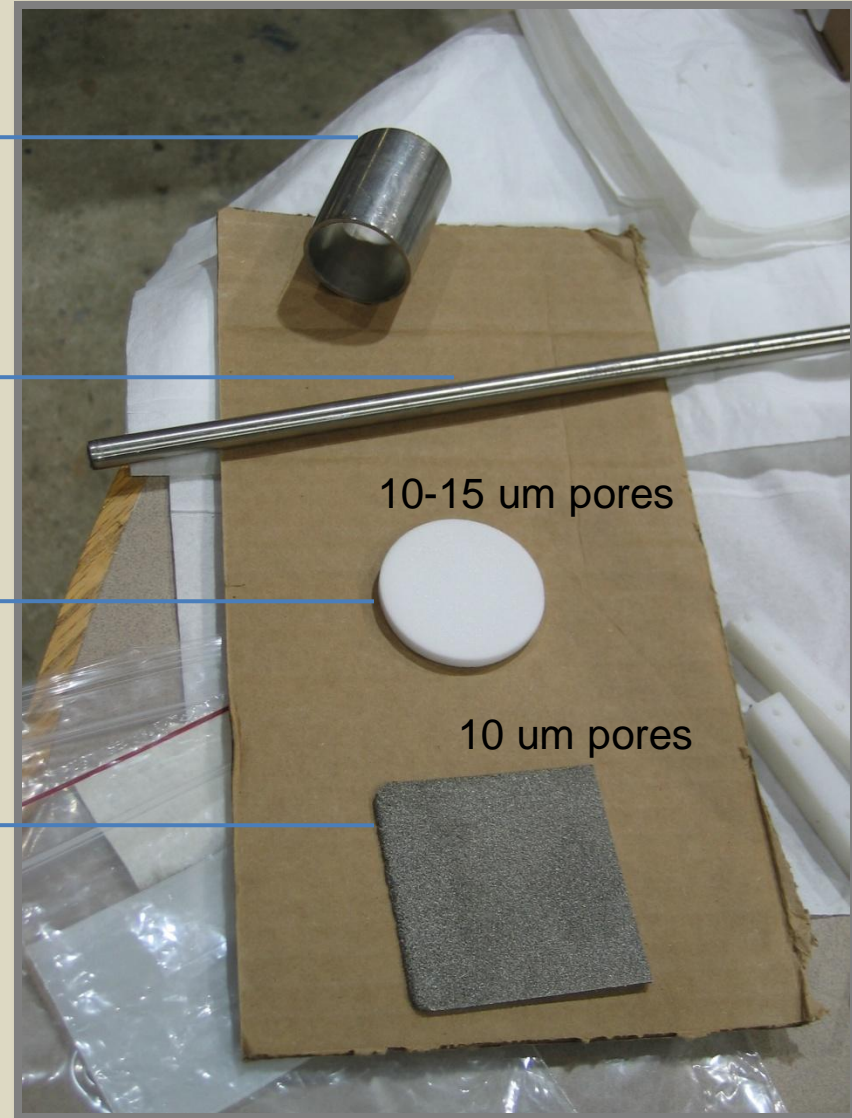
Characterization Scheme

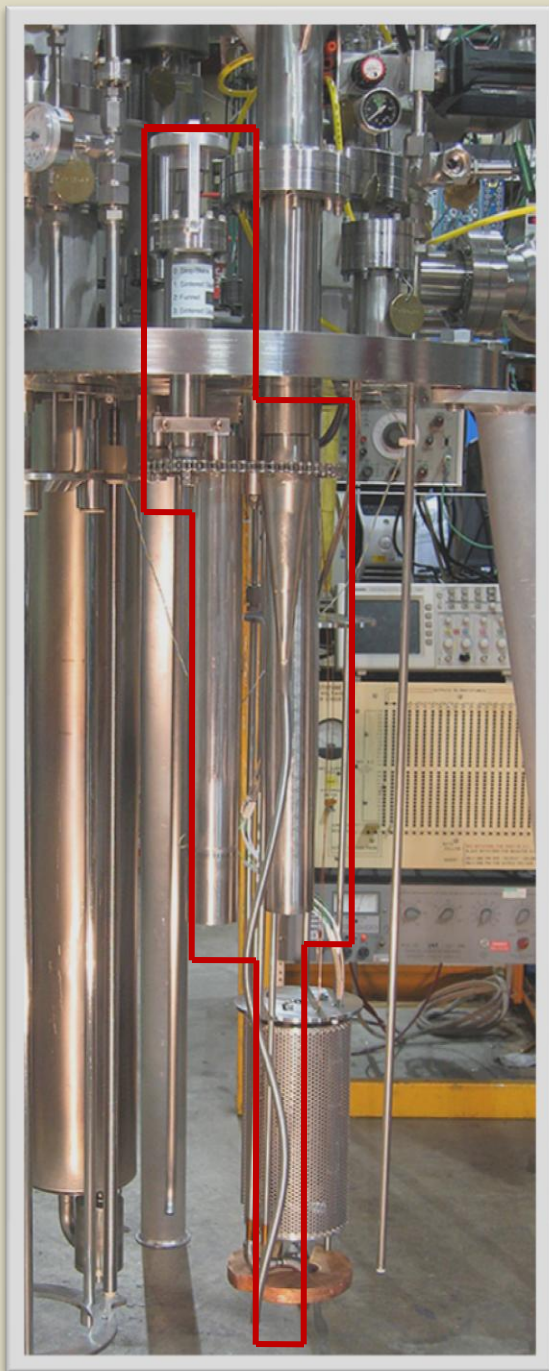
- Place filter materials under condenser outlet



Characterization Scheme

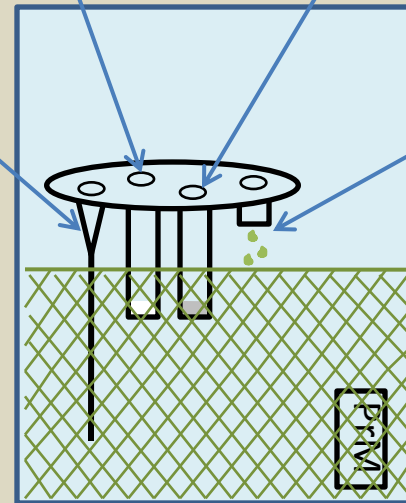
- Blank —————
 - Provide baseline
- Tube —————
 - Remove ions, not particles
- Sintered Glass —————
 - Remove particles, not ions
- Sintered Metal —————
 - And Steel Wool
 - Remove particles, ions



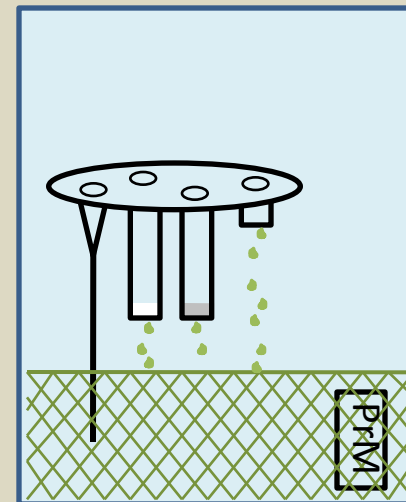


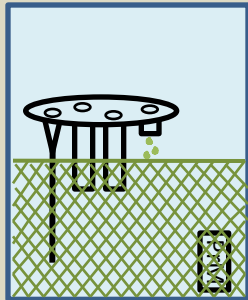
29 Inches

Vary Liquid
Level



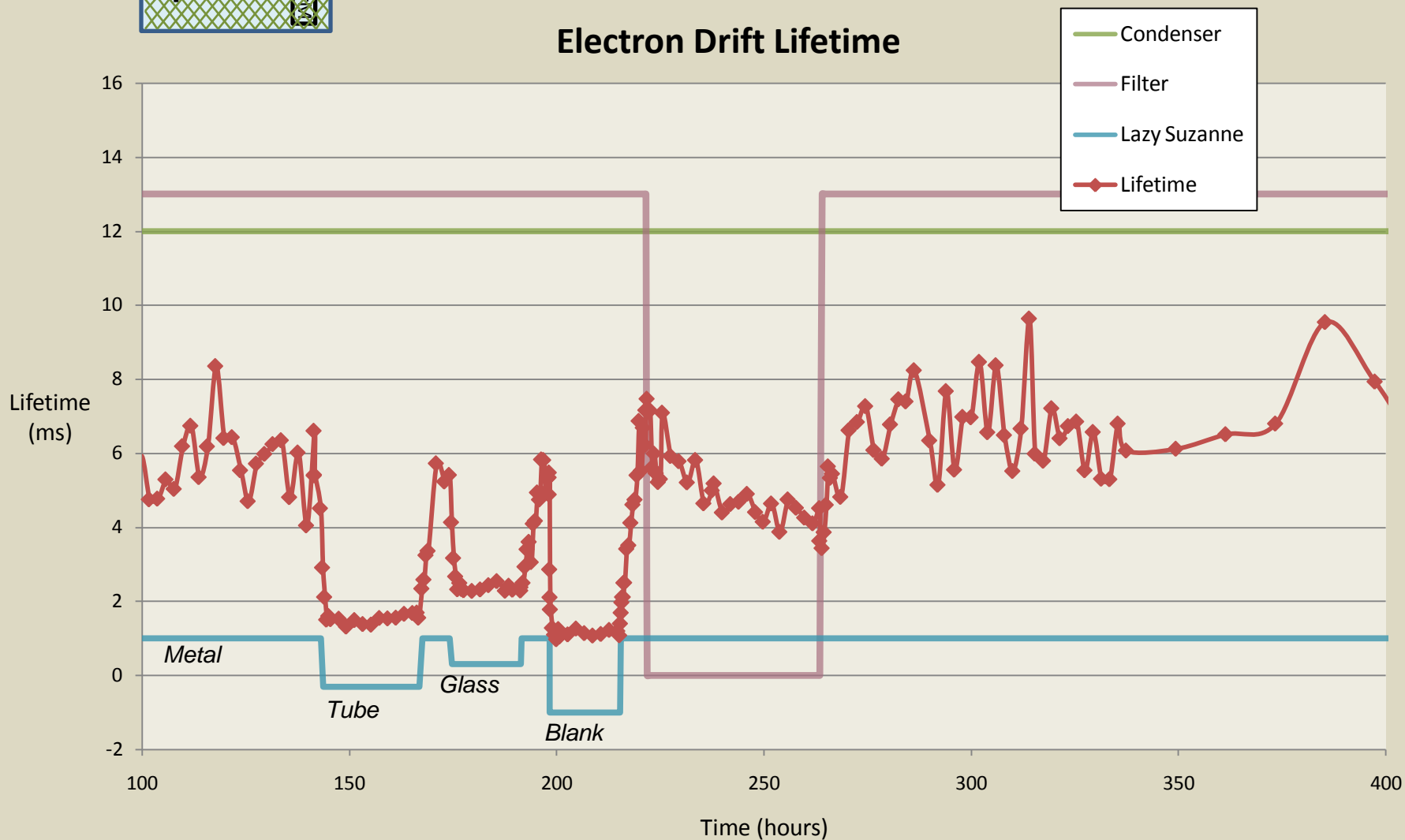
16 Inches

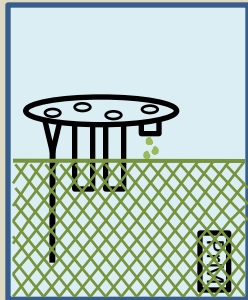




29 Inches Argon

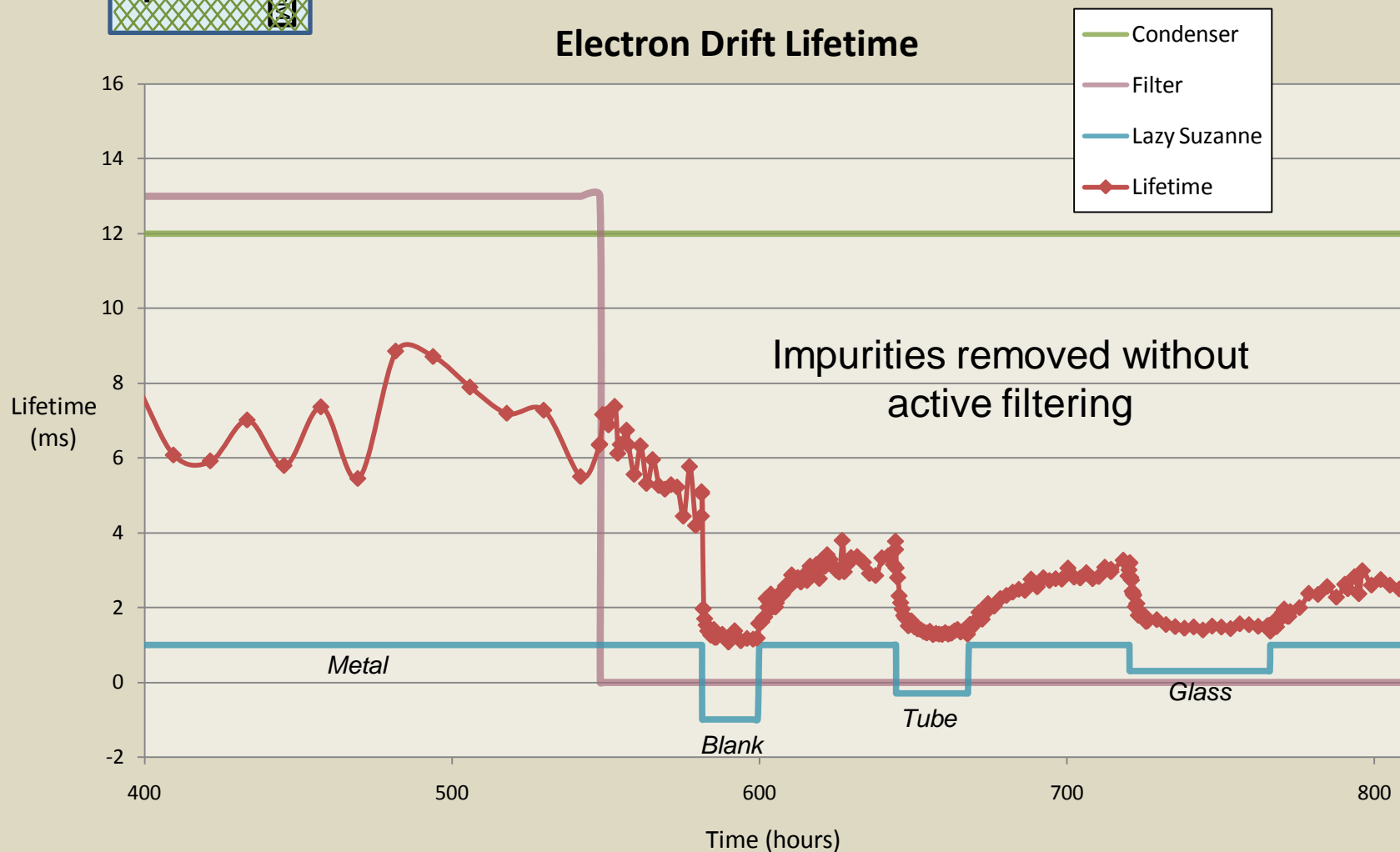
Electron Drift Lifetime





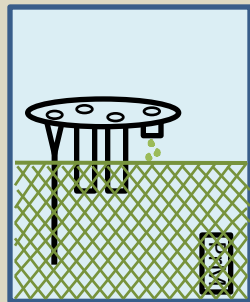
29 Inches Argon

Electron Drift Lifetime



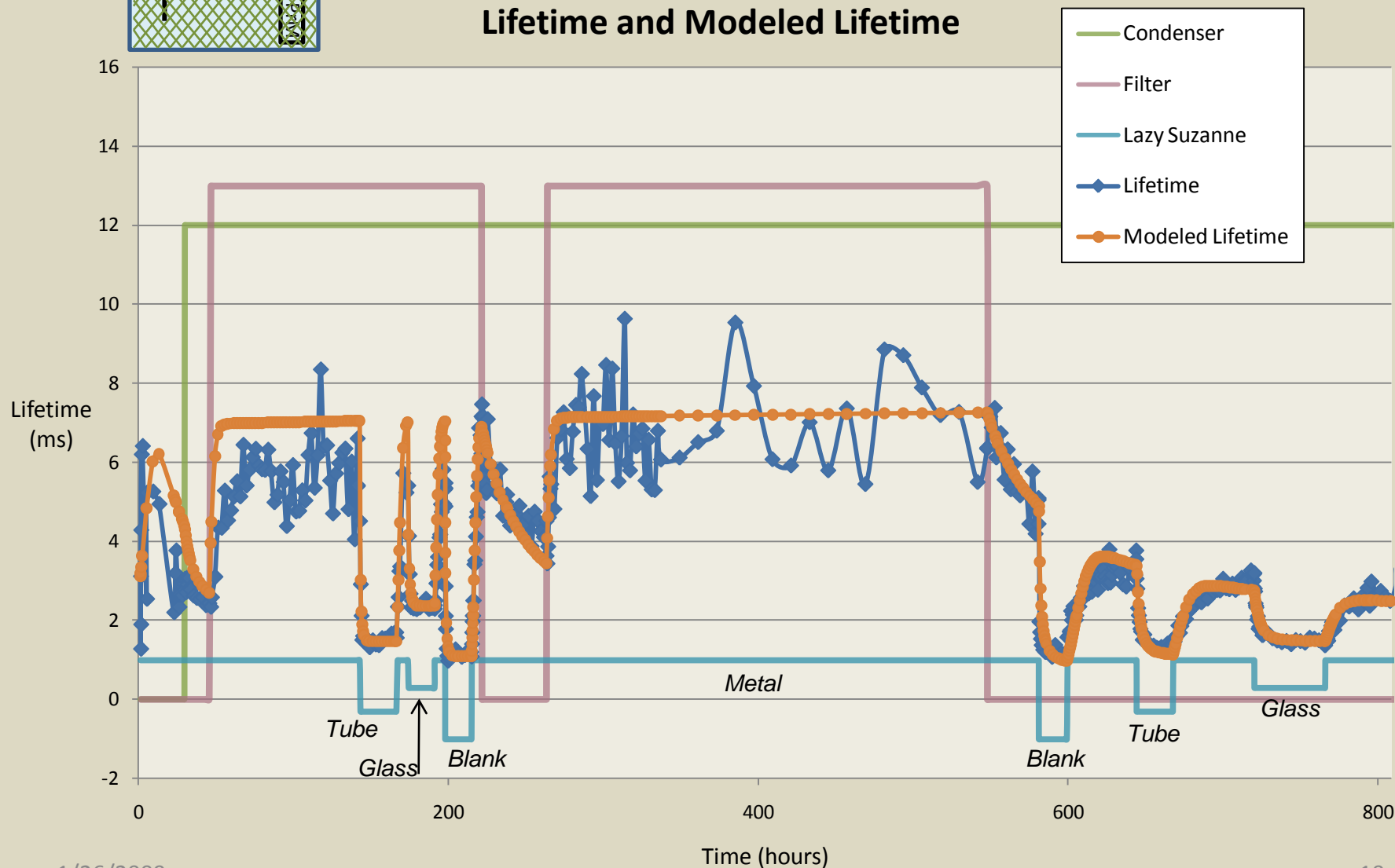
From Lifetime Data with 29 inches Argon:

- Ions not the major problem
- Not a large particulate



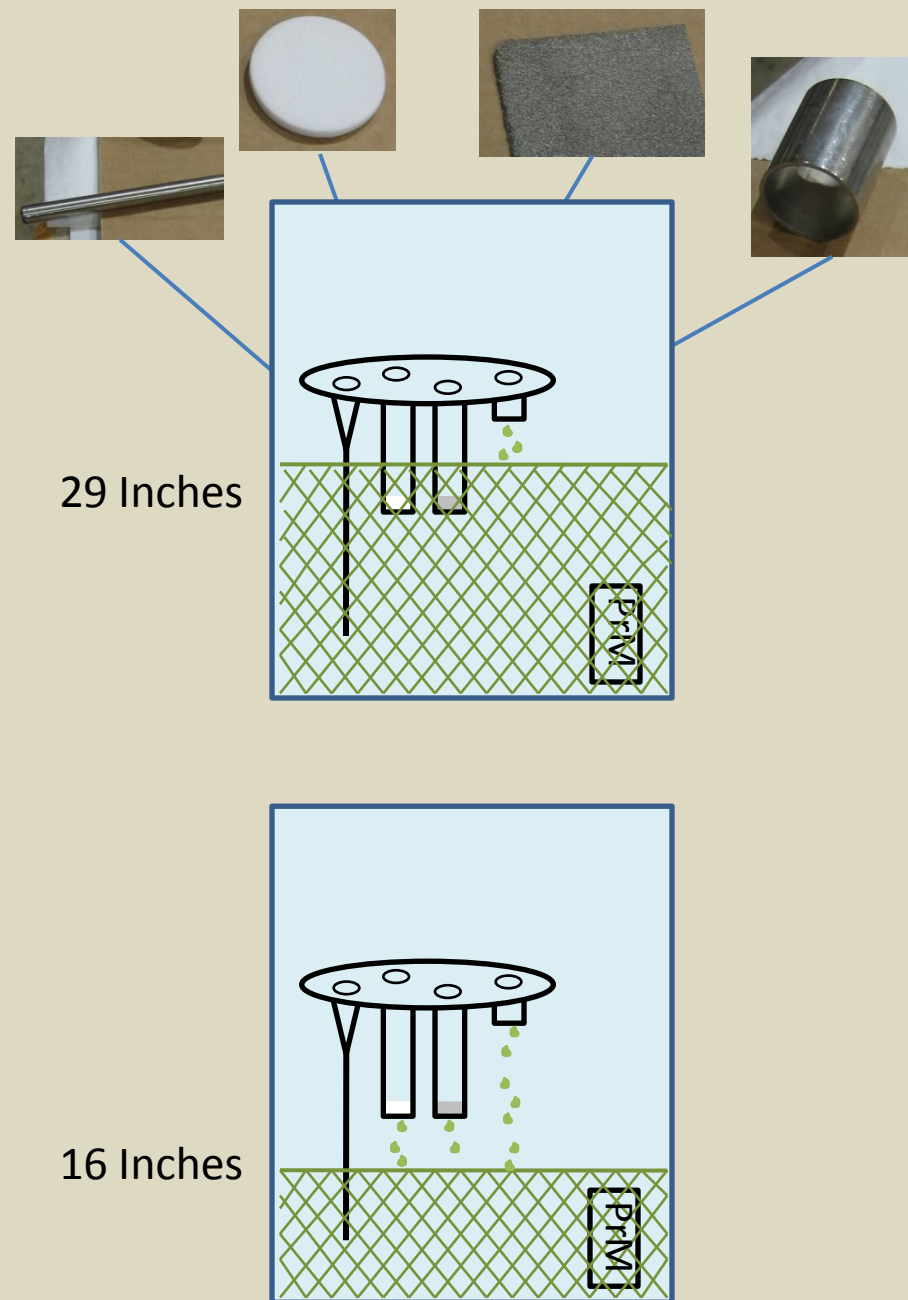
29 Inches Argon

Lifetime and Modeled Lifetime



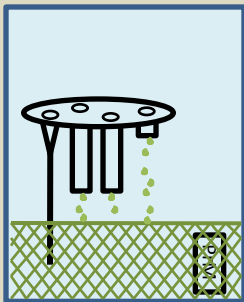
Model Assumptions Parameters:

- Infinite source of impurities
- Performance of filter media related by metal surface area



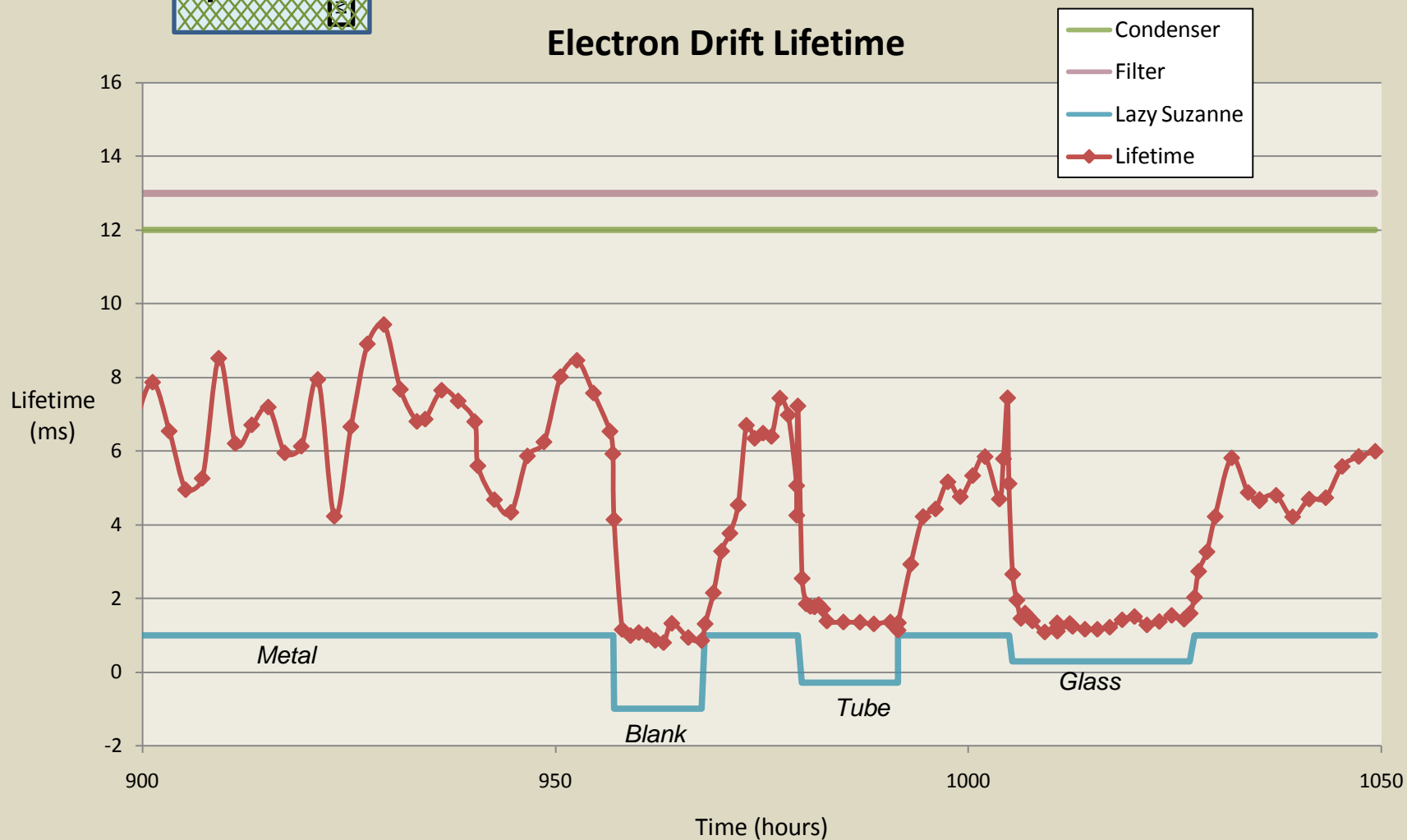
At lower liquid level:

- **Sintered Glass** has substantially less metal surface for impurity adsorption
- **Tube** has less ...
- **Sintered metal** has slightly less ...
- **Blank** does not change



16 Inches Argon

Electron Drift Lifetime



General Inferences

- Gas provides impurities
 - Condenser mixes impurities from gas into liquid
- Technologies for filtering impurities:
 - Sintered metal speeds natural exit from liquid

Future Work

- Identify dominant impurity
 - Water? —————
 - Mix/Other?
- Techniques For Removing Impurities
 - Sintered Metal
 - Existing Filters —————

